

REMARKS

The Office Action has maintained the restriction requirement and has examined only Claim 67. It has rejected Claim 67 under 35 U.S.C. §102(e) as defining subject matter which is allegedly anticipated by the teachings in U.S. Patent No. 6,692,717 to Smalley et al. ("Smalley et. al.")

Applicants have amended Claim 67 and added claims which when considered with the comments hereinbelow are deemed to place the present case in condition for allowance. Favorable action is respectfully requested.

Before addressing the issues raised in the Office Action, applicants wish to bring to the attention of the United States Patent and Trademark Office that the present application contained Claims 105-107 as of the date of the mailings of the Office Action. They were added in the Response dated May 8, 2006. Applicants respectfully request that the Official Record correct the error on the first page of the Office Action, indicating that the highest number of claims herein as of December 22, 2006, was 107.

Applicants have amended Claim 67 and have added Claims 108-110. Claim 67 has been amended to recite that the double- wall nanotubes consist of two concentric nearly cylindrical graphene layers. Support is found on Page 16, lines 2-3 of the instant application. Claim 108 also utilizes this language ,and support for this language in Claim 108 is also found on Page 16, lines 2-3 of the instant specification. Claim 108 also recites that the nanotubes are substantially pure. Support thereof is found on Page 8, Lines 21-24 of the instant specification.

Support for Claims 109 is found on Page 14, Lines 20-21 of the instant specification, while support for Claim 110 is found on Page 14, Lines 29-30 of the instant specification.

No new matter is added to the application.

In support of the rejection of Claim 67 under 35 U.S.C. §102(e), the Office Action cites Smalley et al. According to the Office Action, Smalley et al. disclose double-wall nanotubes, referring to the passage in col. 4, second paragraph and col. 5, lines 36-53.

Smalley et al. relate to the synthesis of single- wall carbon nanotubes. It describes the synthesis of single-wall nanotubes. As described , the process produces “...predominantly single- wall carbon nanotubes with a portion of double-wall carbon nanotubes under certain conditions...” See col. 10, lines 37-41 of Smalley et al.. In other words, the single wall nanotubes are produced with double wall nanotube, with the single wall nanotubes being the predominant product.

The DWNTs of the present application are essentially different from those described in Smalley et al.. First of all, they are different in quality. The DWNTs of the present invention are of higher quality. This means that there are fewer defects in the molecular structure of DWNTs produced by the present invention relative to that described in Smalley et al. Defects, for example, pentagons and heptagons in the hexagonal carbon network of the tube wall, cause sudden changes of a tube axis direction, roughness and waviness of tube walls, kinks, corrugations and blow-ups on the tube, and other deviations from the cylindrical structure pertaining to defectless tubes, which is the primary objective of the present invention. For example, as shown in the Fig. 5 of Smalley et al, the DWNTs produced have kinks, i.e., they are not comprised of double-walled nanotubes having two concentric nearly cylindrically graphene

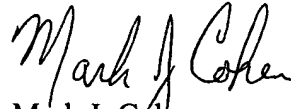
layers, as recited in the present claims. On the other hand, references to Figs. 4, 13 and 15 of the present application, which depict products produced by the process described in the present application, show that DWNTs of the present invention have two concentric nearly cylindrical graphene layers. Thus, these defective features are observed on the TEM images of Fig. 5 of Smalley et al. and are absent in the images obtained of the products of the present Application. Defects deteriorate the properties of carbon nanotubes and make them of lower utility. Thus the DWNTs of the present Application are of much higher quality than those presented in Smalley et al. Consequently, the products prepared by the process described in Smalley et al. are quite different from the products of the present invention.

Without wishing to be bound, it is believed that the reason for this difference is that a significantly higher temperature is used in production of DWNTs in the present Application always exceeding 1200 °C as compares to 700-850 C in Smalley et al.. Higher synthesis temperature facilitates annealing of defects.

Second, Smalley et al. do not teach or disclose a product which is comprised of more than 50% by weight of DWNT's, in which the double-wall carbonate tubes consist of two concentric nearly cylindrical graphene layers, as recited in Claim 67. As described hereinabove, Smalley et al. produce DWNTs, which have kinks. Thus, Smalley et al. do not teach, disclose or suggest a product having at least 50% by weight DWNTs, in which the double walled nanotubes consist of two concentric nearly cylindrical graphene layers as recited in Claim 67. Moreover, Smalley et al. do not teach, disclose or suggest substantially pure DWNTs, with the quality that the nanotubes have two concentric nearly cylindrical graphene layers, as claimed (See Claim 108-110). Thus, the present invention is not anticipated by and is patentable over Smalley et al. Withdrawal of the '102 rejection is respectfully requested.

In view of the amendment to the Claims and remarks hereinabove, it is respectfully submitted that the present case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,



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